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JOURNAL OF ELECTRICITY POWER AND GAS

TELEPHONE NUMBER

Devoted to the Conversion, Transmission and Distribution of Energy

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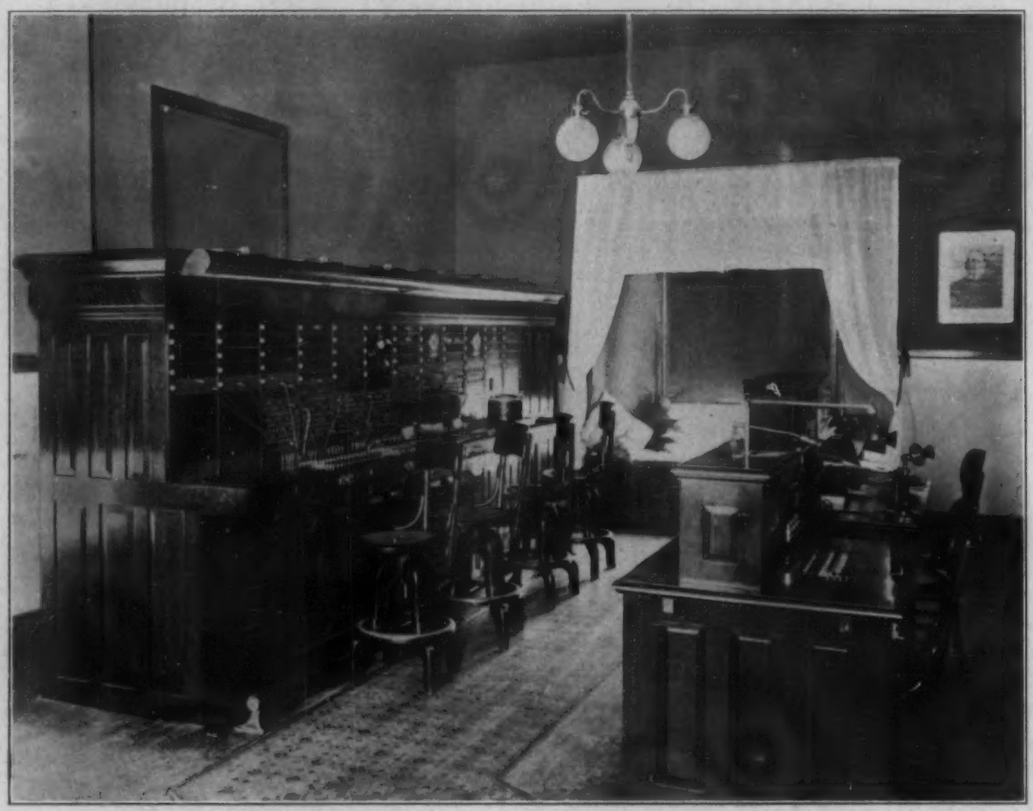
FOR INDEX TO ADVERTISEMENTS SEE PAGE EIGHT



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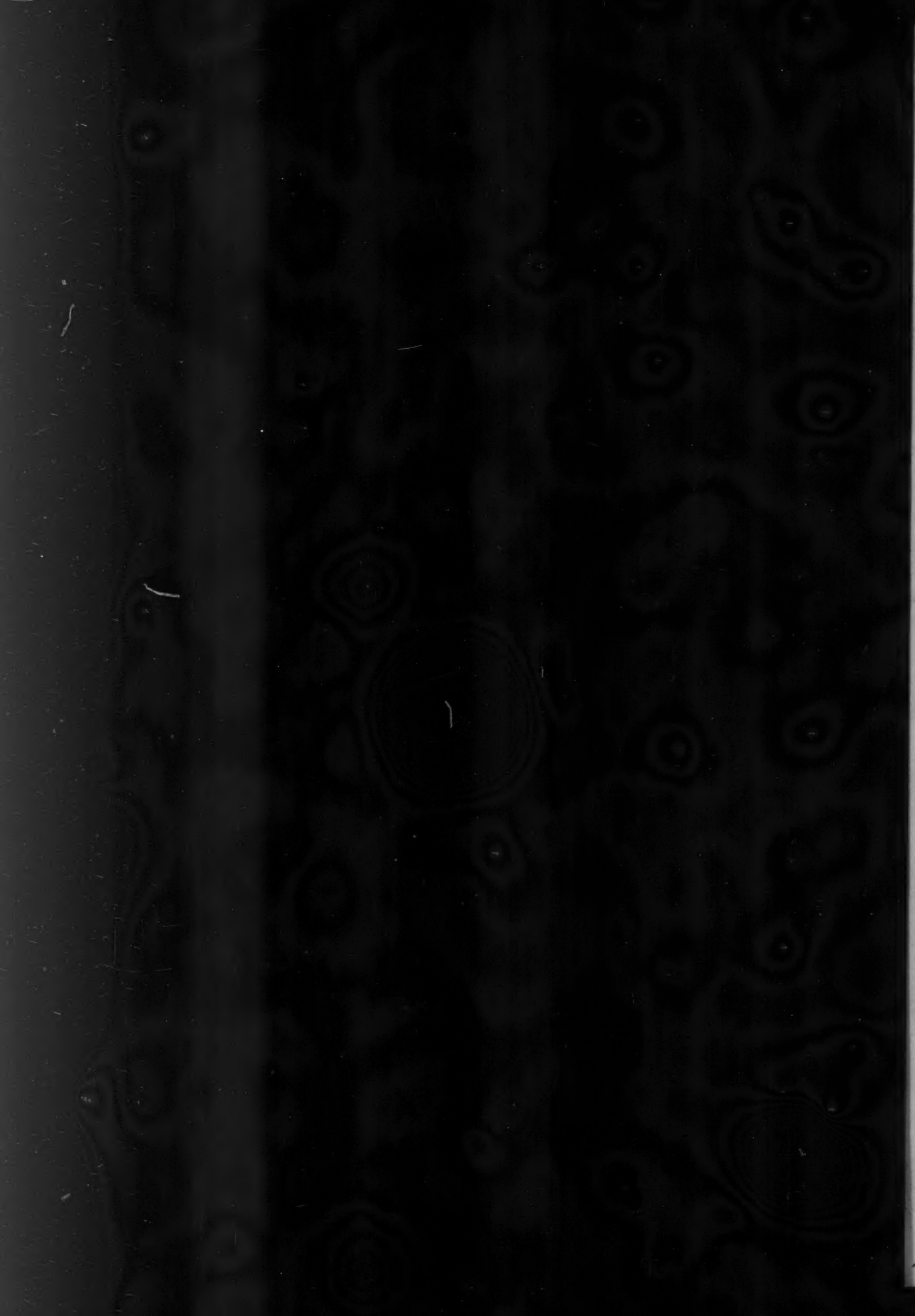

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VOLUME XXIII. SAN FRANCISCO, AUGUST 14, 1909 NUMBER 7

NEW SYSTEM OF THE HOME TELEPHONE COMPANY OF SAN FRANCISCO

BY SAMUEL G. McMEEN

The great industrial activity now known as "the independent telephone movement" began only sixteen years ago. Telephone systems in the United States were under the control of the Bell telephone company from the invention of the device in 1876 until 1893. The fundamental telephone patents expired in 1893. This opened the telephone art to the general public, because it no longer was necessary to secure telephones solely from the patent-holding company, nor to pay royalties for the right to use them, if secured at all. Manufacturers of electrical apparatus generally then began to make and sell telephones and telephone apparatus, and operating companies, also independent of the Bell organization, began to install and use telephones. At the end of seventeen years of patent monopoly in the United States there were in operation a little over 250,000 telephones. In the sixteen years since the expiration of the fundamental patents, independent telephone companies throughout the United States have installed and now have in daily successful operation over 3,000,000 telephones. The official reports of the government Department of Commerce and Labor for 1907 give the total of independent telephones in the United States as 2,986,515. The growth has been steady in the year and a half since that report. In other words, since its first beginnings, independent telephony has brought into continuous daily use about six times as many telephones as were brought into use in the longer time of the complete monopoly of the Bell organization.

In its earliest days the independent movement suffered from the lack of the right to use many minor elements of apparatus and machinery because these still were protected by patents controlled by the Bell company. Stimulated by the needs of the time, inventors and designers supplied the needs of the independent companies so thoroughly that now there is no part of a telephone system for a city, however large, which is not obtainable in the independent telephone market without the payment of royalties, large or small, with their consequent drain upon earnings. Automatic telephone apparatus, eliminating the need of employing human operators, is a development of the art which has been made entirely by the genius of the independent forces.

The independent movement had its origin in the Middle West. Its spread brought it to the Pacific Coast in due course, and its success nowhere has been more prompt and sound than here.

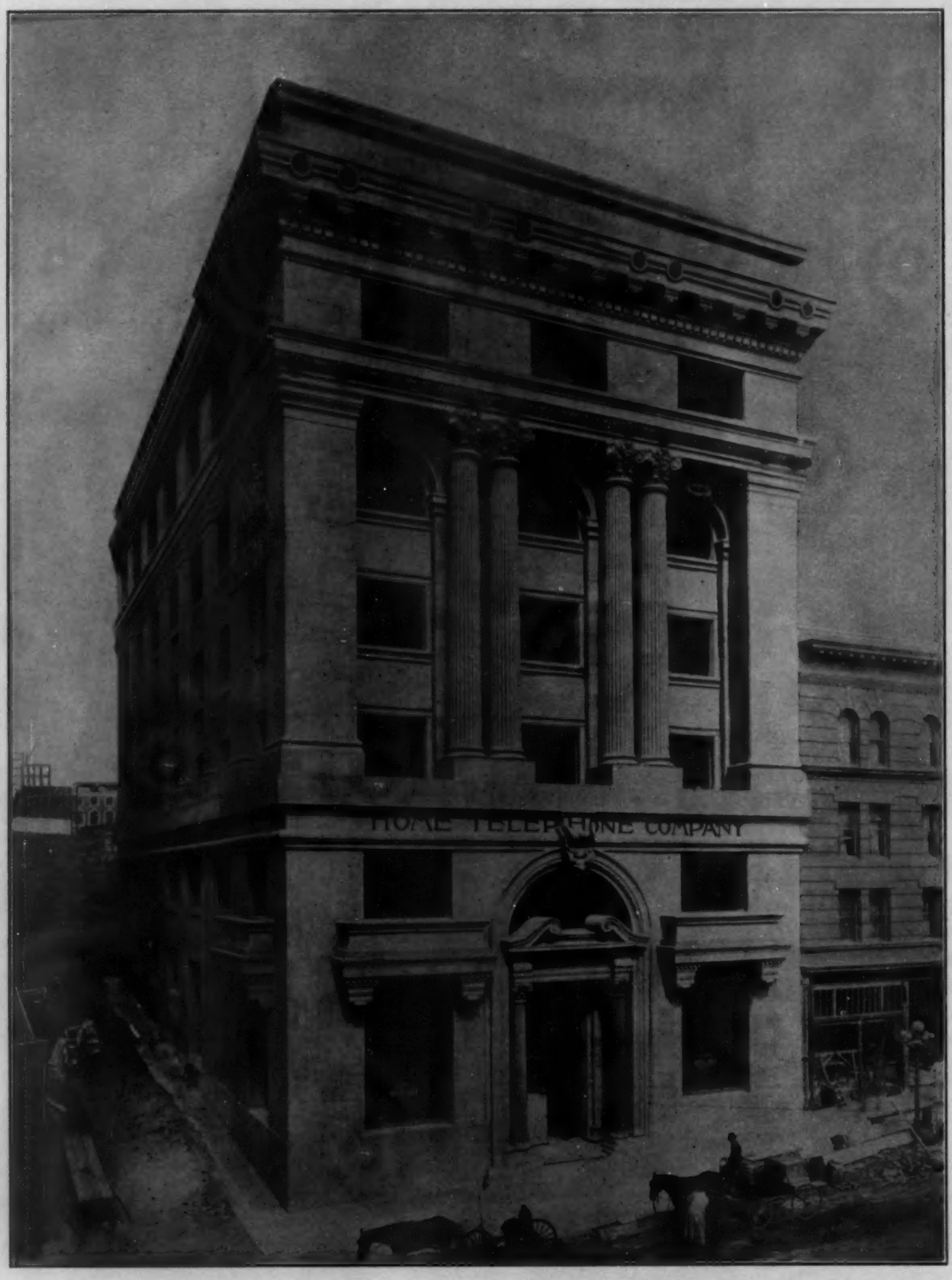
In 1902, the Home Telephone and Telegraph Company began in Los Angeles the construction of the first important Independent telephone plant on the Pacific Coast. The usual manual telephone switchboard was adopted for the first central office, but the balance of the Los Angeles plant was made automatic. Its growth was unusual, if not unprecedented, and from a modest beginning of five thousand telephones it has grown, in a very few years, to a system of over thirty-one thousand.

The success of the project was an incentive to the further establishment of Independent systems in other sections of Southern California. Pasadena was built and installed with long distance lines connecting the plant with Los Angeles. Santa Barbara followed, and one by one all of the important cities and towns south of the Tehachapi line now have Independent telephone plants, each of which is connected with Los Angeles by long distance lines.

The success which attended the Independent movement in the southern end of the State logically gave rise to the extension of the movement to the northern portion of California; and with that object in view, the persons identified with the initial Independent plants in Los Angeles and elsewhere, applied for and secured by purchase a franchise from the City and County of San Francisco for the construction and installation of a plant in that city, the plan being to build and equip similar plants in all of the near-by bay cities, Oakland, Berkeley, Alameda, Fruitvale, etc.

Exchanges in Oakland and Emeryville now are in operation and the Berkeley and Fruitvale exchanges are in process of construction.

In San Francisco the construction work so far completed includes 413 miles of underground conduits and 850 manholes. These distribute wires throughout an underground area containing 160 miles of streets.

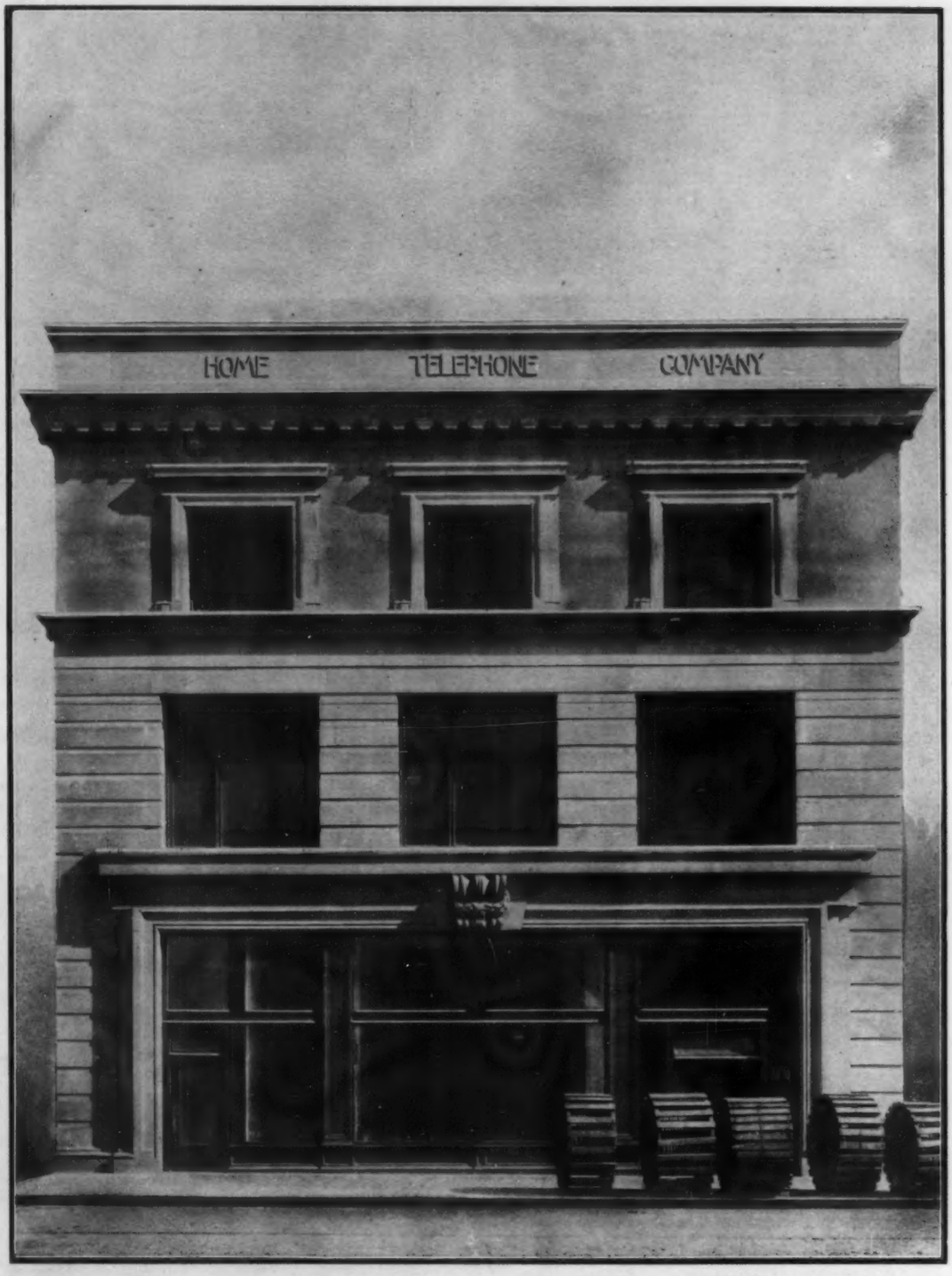


Grant-Avenue Central Office, near Sutter Street. Serves the Retail, Financial and Office District.

This construction extends far beyond the legal requirements for underground work under the city ordinances ,so much so that it will be many years before there is a necessity for its further extension.

The general design of the automatic telephone exchange system of the Home Telephone Company of San Francisco is based on a study made during 1906, immediately following the earthquake and fire. This design has been developed further since the first general study, in order to adapt the construction to the conditions of the reconstructed city, as these conditions have disclosed themselves.

The plan of the system in general is to accommodate the subscribers which can be secured during a long period after the first construction. There are certain portions of a telephone system which require it to be laid out of a size sufficient for the needs of a considerable future time, in order that the greatest economy of construction and operation may be secured. The general study for San Francisco determined the



Howard Central Office, Howard Street, Near Fifth Street. Serves Downtown District, South of Market Street.

sizes and arrangement of these parts, and they have been built in that way. Examples of these parts which must be built of an ultimate size in the beginning are the underground system of conduits and manholes, and the central office buildings into which the subscribers' lines and trunk lines are carried. The underground system of conduits and manholes for San Francisco was designed and has been built of such a number of ducts or pipes and of such a size as to enable the conduit system to carry, without further general increase, all of the necessary lead sheathed underground telephone cables which will be required in the underground districts for a total estimated number of subscribers much greater than the immediate expectation. The telephone cables themselves are drawn into the conduit system thus provided as the growth in subscribers shall require.

The central office buildings of the system are designed so that each serves a definitely allotted portion of the city. Each such building is designed large enough to accommodate the apparatus and machinery required for the switching of all of the lines of its

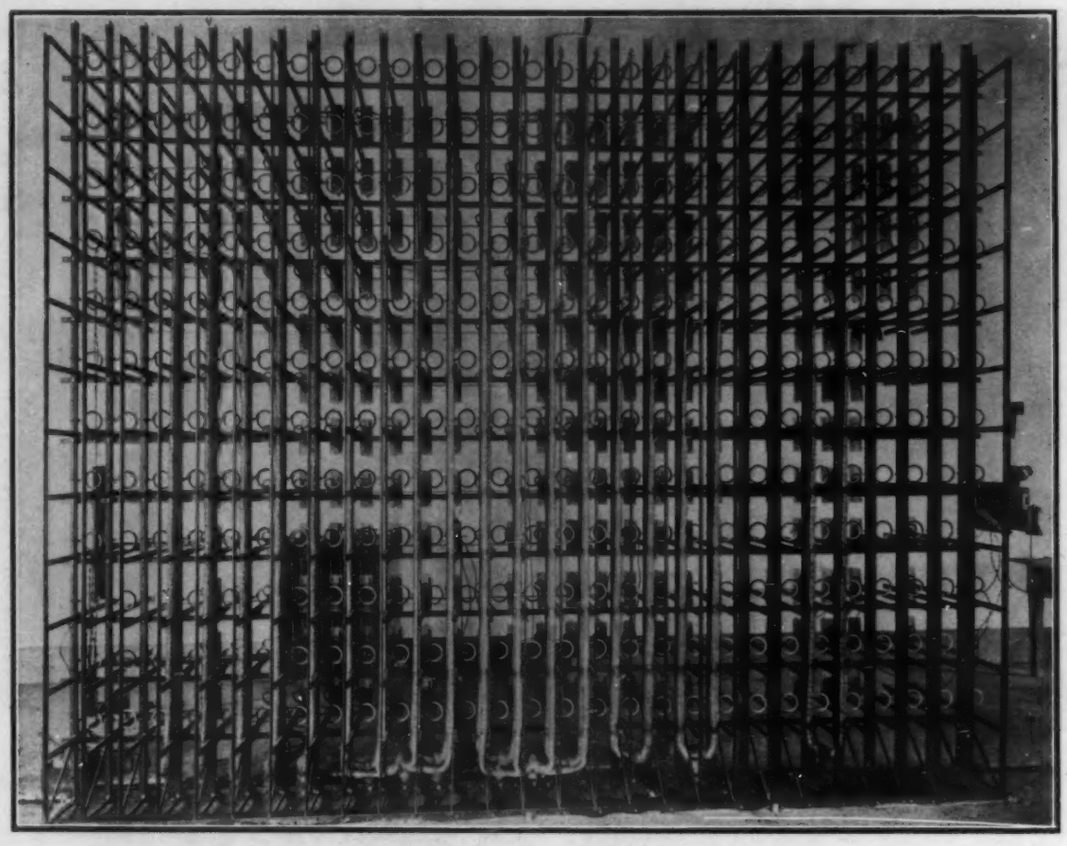
Warehouse.

district at the end of the long period used as the basis of the plans. This terminal and switching apparatus, power machinery, storage battery and other switching equipment is in part installed of its ultimate size at the beginning; other parts, like the cables in the underground conduits, are arranged in advance for convenient addition in units as the growth in subscribers shall require.

The switching equipment for San Francisco is of the automatic type, in which human operators are not utilized, but in which a simple act on the part of the calling subscriber causes the central office machinery to connect his line with that of the subscriber called.

The various central offices are interconnected by means of special trunk line cables over which a con-

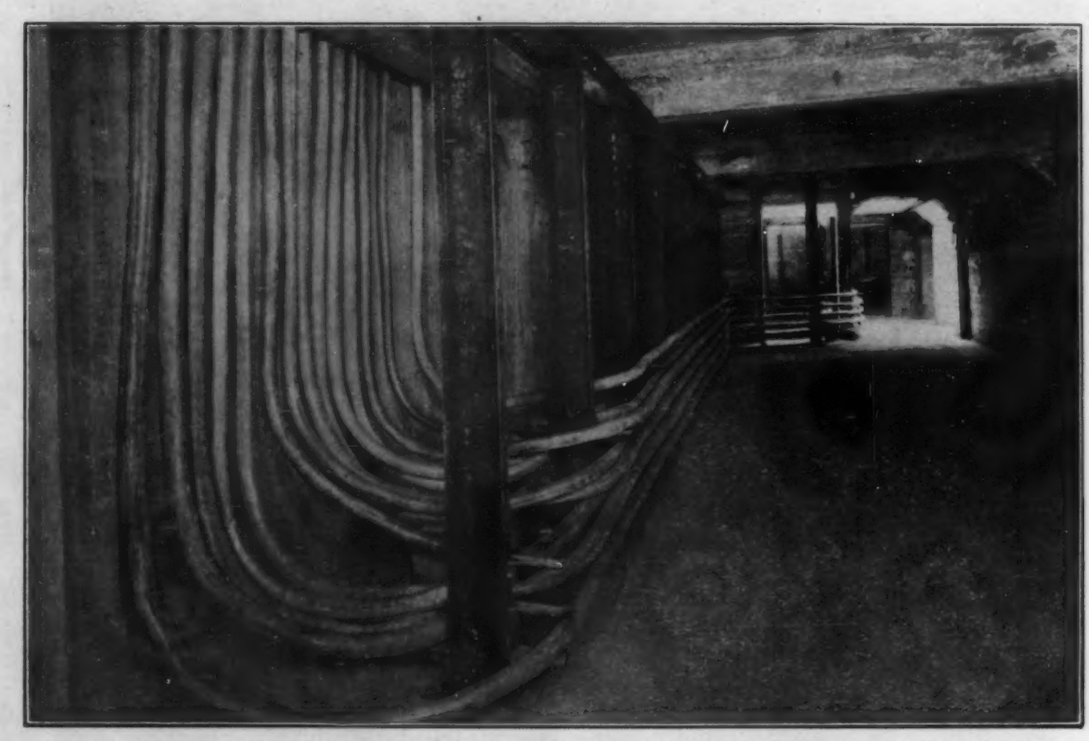
Shop.



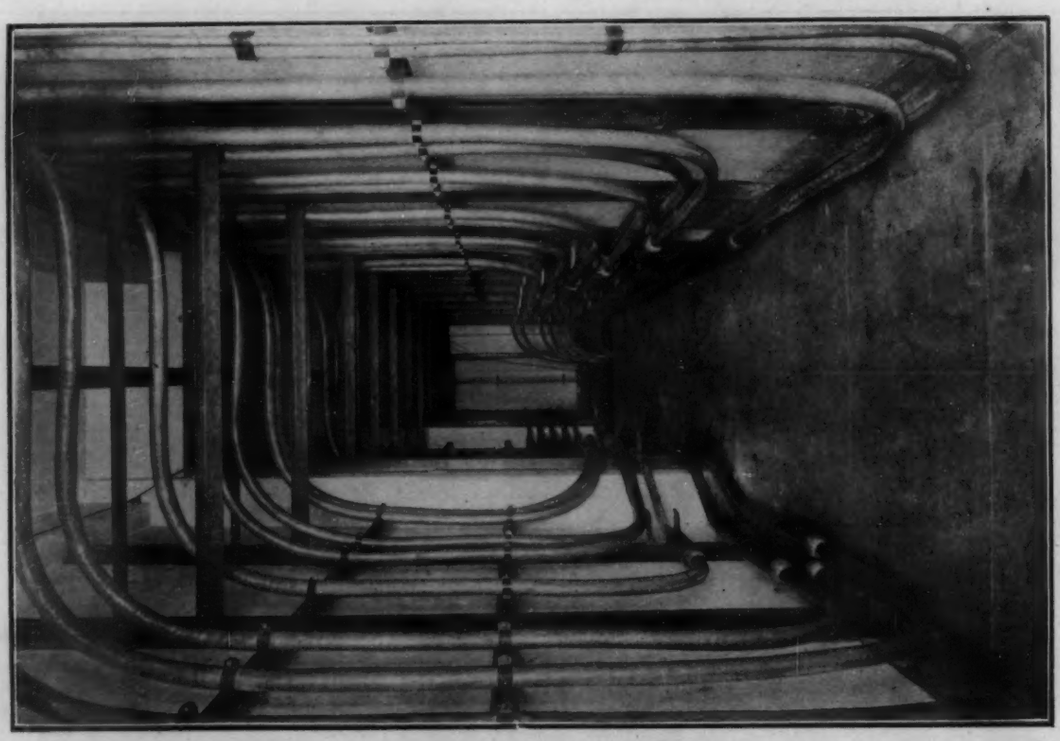
Central Office Frame for Terminating Cables.

nection between a subscriber in the district of one central office to a subscriber in the district of another central office is made by automatic means and by a process identical with the connection between two subscribers located very near together.

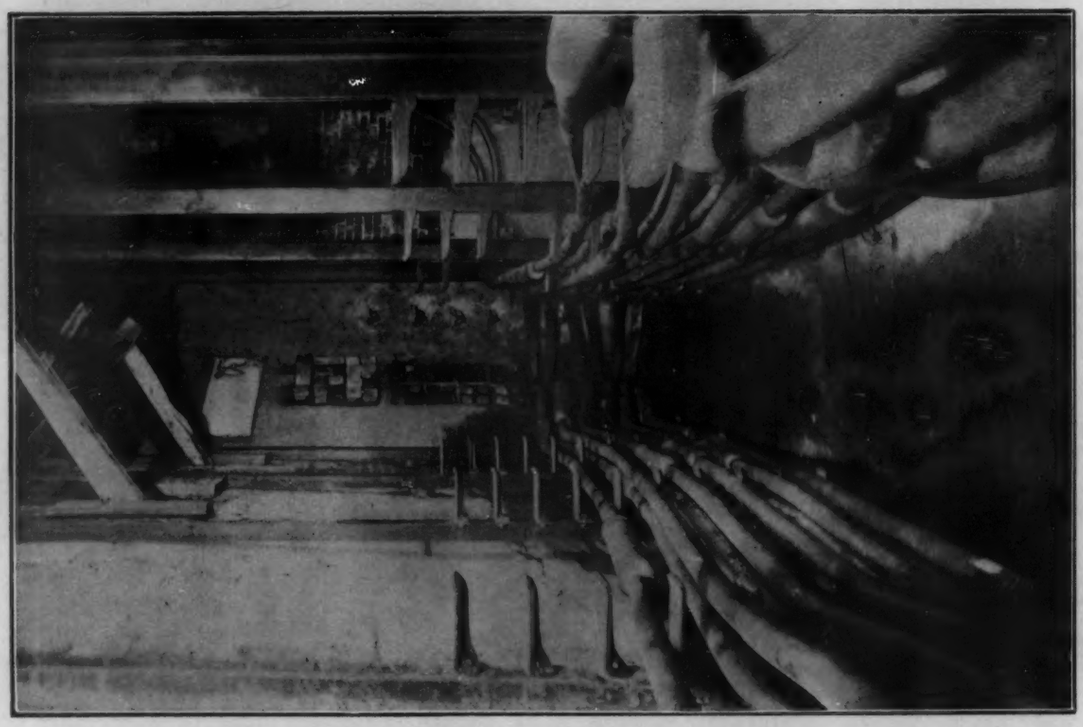
The scope of the plans is such as to enable 125,000 subscribers to be served without any change in the fundamental design and by means merely of addition in equipment and lines, as the subscription for telephone service shall increase.



Central Office Details. Cables Entering Howard Street Central Office, to Pass Up Through Wall Ducts.



Central Office Details. Cables Passing From Top of Shaft to Main Distributing Frame on Floor Above.

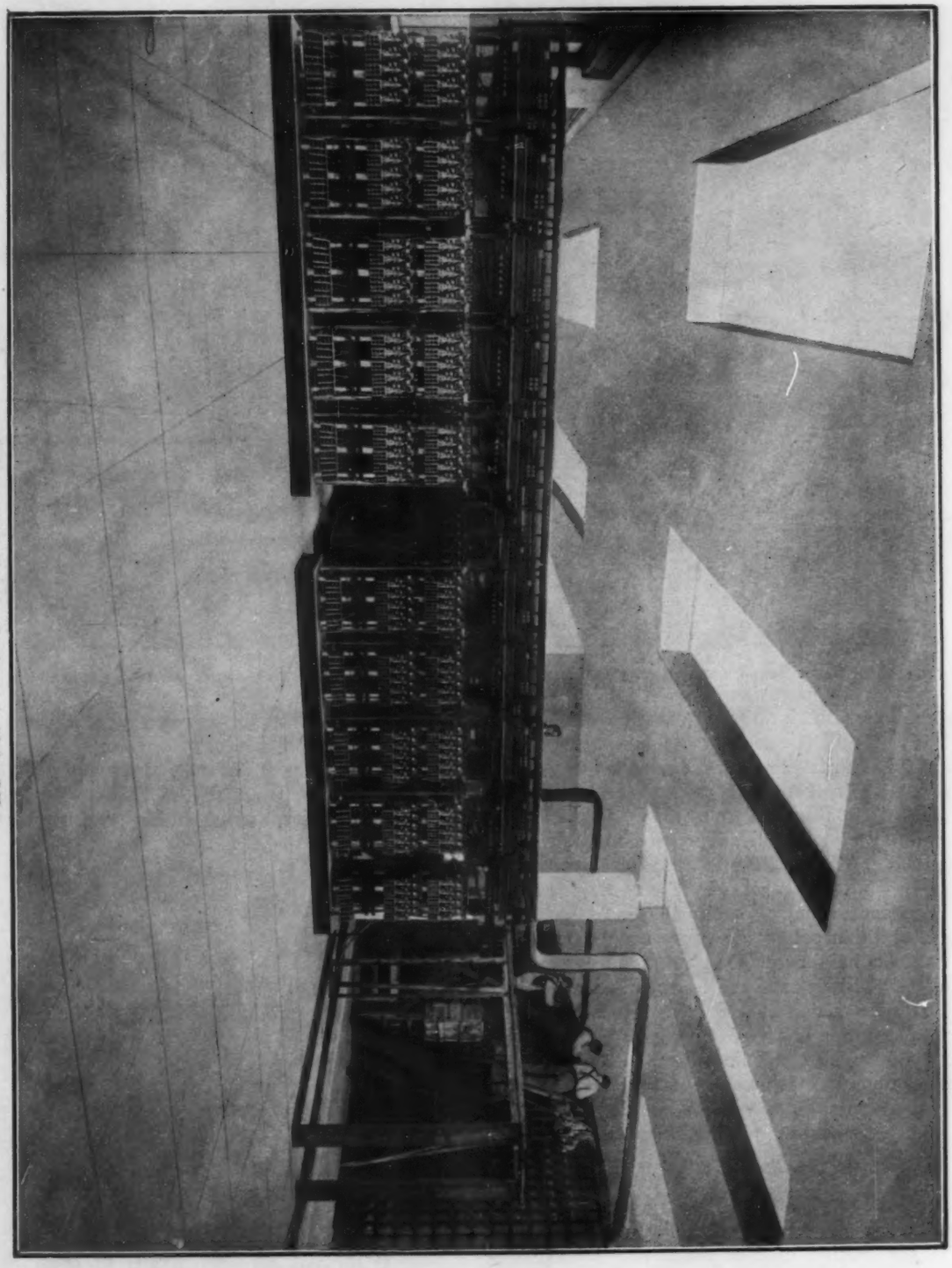


Central Office Details. Cables Passing From Building Entrance to Bottom of Cable Shaft. Grant-Avenue Central Office.

It also takes into account the present and future requirements of telephone traffic between San Francisco and suburban points. A considerable volume of business is transacted daily between San Francisco and Oakland, Berkeley, Alameda, San Rafael, Sausalito and other towns and cities in neighboring counties about San Francisco bay. A large part of the business population of San Francisco has residence in these suburban places, passing to and from San Francisco daily. For these reasons there is a large and growing demand for telephone service between San Francisco and these suburban points.

The general design of the San Francisco telephone system contemplates reaching these suburban points over special trunk lines with the greatest economic speed and with a high grade of voice transmission.

The trunk line connection between San Francisco and most of the suburban points is to be made through steel armored, lead encased, paper insulated, submarine telephone cables.



Automatic Switching Equipment, Main Office.

The general design of lines and apparatus contemplates the ability to connect long distance lines with the lines of San Francisco patrons, and to furnish, by these means, a high-grade long distance service between any San Francisco telephone of the Home Telephone Company and all other independent telephones within the range of the long distance system as it shall extend.

The plans call for the establishment, at the outset, of five main central offices, each serving a district of its own, and the establishment of additional offices and the subdivision of office districts at later times as the growth of the city and the system shall require. Four of the central office buildings first required have been constructed; all of them are enclosed and the installation of the power machinery, switching equipment and terminal apparatus is under way in all of them. The fifth immediate central office is under design and construction upon it will begin at an early date.

The general offices of the company are located in the principal telephone building in Grant avenue, near Sutter street. That building is of seven stories, with a large basement, and provides room for present and

Drawing Underground Cables Into Conduit System. Reel of Underground Cable at Vault in the Distance.

future administration, for the automatic switching of all the lines of its district and for the equipment necessary for both suburban and long distance traffic.

The building is of steel frame construction, the exterior being of Colusa sandstone. It is classic in design and the architects have expressed in their work the thought that the building is used for but a single purpose. This is made evident by the undivided treatment of the facade, a unity so seldom seen in buildings.

The Corinthian colonnade comprises three of the upper stories in height and is the dominating feature of the facade. This is crowned by the classic entablature and cornice which take in the top floor of the building. The order is raised on a base three stories in height from the sidewalk line.

The architectural scheme of the interior of the public office follows the exterior in simplicity and dignity. The ceiling is octagonally coiffured and is supported upon columns and pilasters of the Corinthian order.

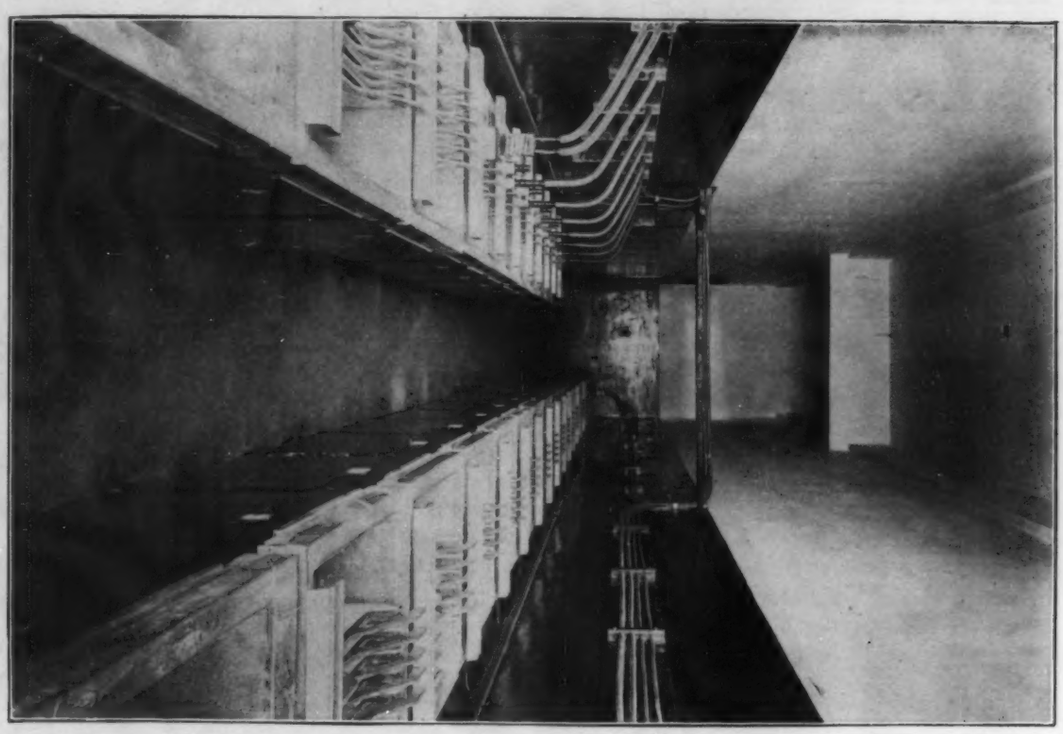
All the company's office buildings are of fireproof construction. They were designed by and erected under the supervision of Messrs. Coxhead and Coxhead, architects, of San Francisco, by whom the foregoing details descriptive of the Grant avenue building are furnished. Typical floor-plan drawings are shown among the photographs subjoined.

A special building, complete and in use for a year or more past, provides warehouse and shop facilities with adjoining outdoor storage for heavy machinery and supplies.

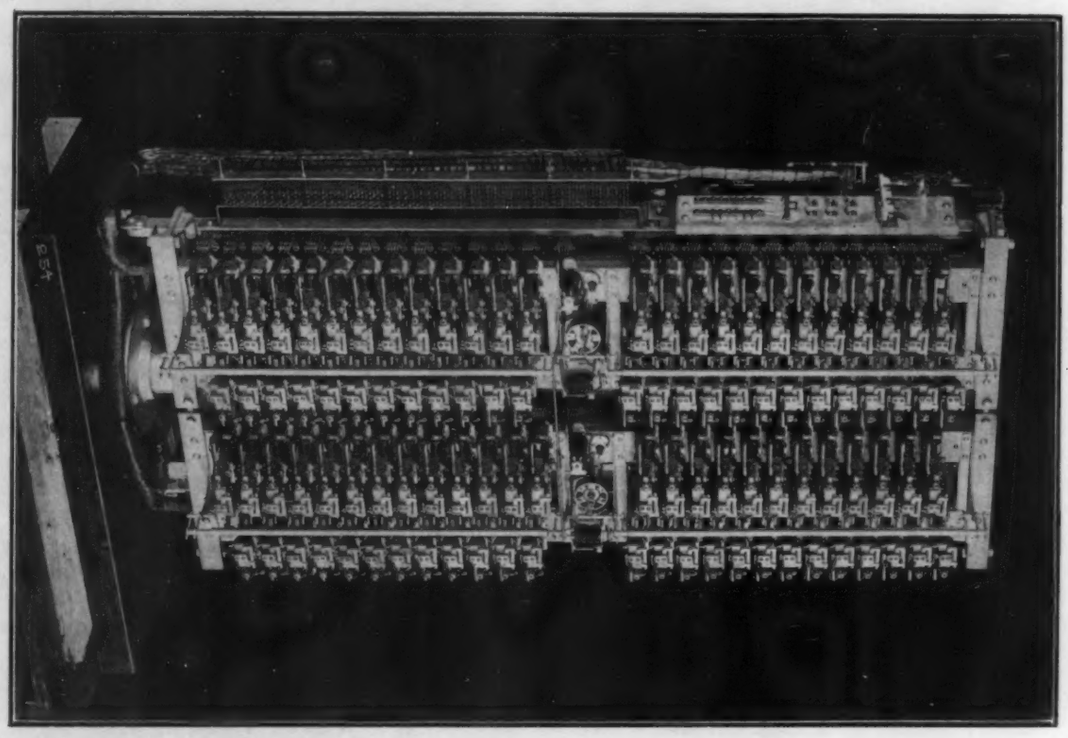
In execution of the plan of designing the underground conduit system of an extent and capacity to make it unnecessary to do extensive conduit work in the immediate future, that portion of the plant has been built to cover a larger district than is required by the present local ordinances governing the distribution of electrical circuits. It is to be expected that the conduit system now completed will serve the needs of the Home Telephone Company, and meet all legal requirements as well, for a considerable term of years.

Shaded Portion Shows Underground Distribution System

The conduit system is throughout of a type chosen as best adapted to meet the conditions of heavily congested streets in which much future digging will be



Automatic Switching Equipment. One Hundred Individual Line Switches.



Central Office Details. Storage Battery Plant.

done, to meet the particular underground earth conditions (sand, slope, seawater, etc.) and with a view to the presumption that earthquake shock may recur.

A subjoined map indicates the general portion of the city served by the conduit system, and in all that region the main conduit lines now are completed. In the dense business center of the city, branches of the main cables in the underground system are carried through underground lateral pipes into the buildings. In the less densely built parts of the underground district the services from the underground cables to the buildings either are entirely direct, as last mentioned, or distribution is made from distributing poles in back streets or on private property. These poles are reached by lateral cables from the main underground cables.

The entire system of distributing poles within the

underground area is set and the most of them are joined to the underground system by the necessary lateral pipes.

The entire system of trunk cable sections interconnecting the several central offices has been drawn into the underground system. The trunk cable sections have been spliced, and are connected to their permanent terminal positions in two of the four central offices. Connections at the other two are ready to be made. The greater portion of the underground cables for subscribers' lines is in place and additional cables of this class are being drawn, spliced, and terminated continuously.

Practically all buildings in the downtown district now are connected with the underground cable system and are supplied with interior cabling and wiring, permitting telephone service to be given to any occupant.

In the region lying outside of the underground conduit area, the telephone circuits are distributed by means of lead covered cables carried on poles. The circuits are distributed from these aerial cables to subscribers' premises by means of insulated wires. These methods eliminate the troubles due to the use of bare wires strung on insulators. There is no bare wire in the entire system.

The automatic switching equipment installation is under way in each of the four central offices, and is complete in the Grant avenue office. The equipment in each office consists of machines for producing and controlling the currents necessary for operation, a storage battery co-operating in this control, devices for terminating and distributing lines, apparatus for testing and record clerks, and for the distribution of information called for by the public. Part of each of these general classes of the entire equipment now is on hand and in place, or on hand and in process of installation. The installation is going forward rapidly, and service will be inaugurated immediately.

A further general element of equipment is an automatically operated service-meter system. The local ordinances of San Francisco, relative to telephone service, provide that such service rendered to business and professional patrons shall be paid for at rates relative to the amount of use in a given time. The purpose of the meter system, therefore, is to record the number of answered calls made by such a business or professional patron. The meter system is wholly automatic in its action, and a meter effects a count of one call only when a call has been made and has been answered by the distant subscriber.

The manufacture of the entire service meter system is completed. Its installation is going forward in the several central offices with that of the other parts of the mechanical and electrical equipment.

Provision is contained in the equipment for the operation of private branch exchanges, wherein a group of telephones gives local service between different parts of a suite of offices or of a store or factory, and in which any of these local telephones may make calls to and be called by any of the telephones throughout the city.

Steel armored, lead sheathed and paper insulated submarine trunk cable to connect the San Francisco system with the Oakland system is under manufacture. Its delivery, ready for splicing and laying in San Francisco bay, will be made at once. This submarine trunk cable will carry conversations between the San Franrisco system and the now operating automatic system in Oakland. Ultimately this cable, with others like it, will furnish communication between San Francisco and the entire suburban region on the east side of San Francisco bay.

In the same manner, by means of submarine cables, Sausalito, San Rafael and the general suburban region of Marin county and counties further north will be connected with San Francisco.

Special machinery and apparatus for suburban and long distance service already are designed, of a type adapted to the special needs of the problem.

The general office of the Home Telephone Company of San Francisco, in its Grant-avenue building, are conveniently centered with respect to other downtown interests, which now are re-established in permanent quarters, after the temporary housing elsewhere since the fire.

POLE DAMAGE BY WOODPECKERS.

Considerable damage is being done to telephone, telegraph and electric light poles by members of the woodpecker family. These birds originally built their homes in the dead or dying trunks or limbs of trees, but for some reason best known to themselves, have come to the conclusion that the peeled pole offers better conditions for a home.

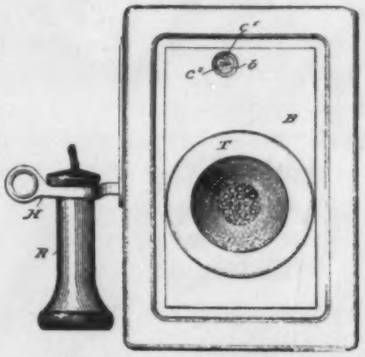
They have become so ravenous of late that their depredations are attracting considerable attention among those who are compelled to use quantities of wooden poles. Their activities spread over a wide portion of the United States, notably in the South, Southwest and Central West. Cedar poles seem to be the ones most frequently attacked. The birds bore into them at any height from the ground, and the holes which they make are often two or three inches in diameter and four or five inches deep. Such an amount of wood drilled from a stick of timber which is carrying a load of wires naturally weakens the strength of the line.

Frequent inquiries have been made by the Forest Service in this connection, but the only information to date which the government has been able to obtain is that on a casual inspection of treated and untreated pole lines in Louisiana. In that region it was found that poles which had been impregnated with creosote oil were not attacked by the birds, whereas untreated poles under the same conditions were very severely injured.

Whether or not creosote will prevent such attack is not definitely known, but the Service is investigating this problem, and should this oil prove a preventative, it will fulfill a two-fold purpose. It will protect the poles from decay and destruction from animal life. In southern Indiana, some members of a traction company thought that they could prevent further destruction of their poles by filling the holes in the wood with stones. The birds, however, simply drilled around the stones and made the conditions much worse. This apparently does not seem to be a means of preventing their depredations.

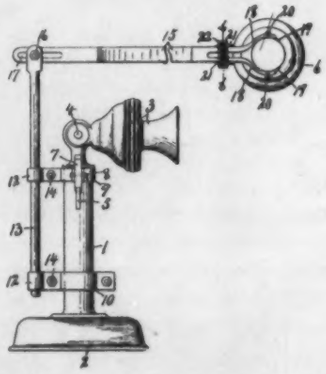
PATENTS

928,115. Telephone Metering System. Richard M. Eaton, Niagara Falls, N. Y., assignor to The Dean Electric Company, Elyria, Ohio. In combination with a telephone cabinet, a plate, time measuring mechanism carried by the plate, a movable receiver hook controlling said time measuring mechanism and so supported from the plate as to pass therethrough,



contact, springs associated with the receiver hook and carried by the plate, said cabinet having an opening therein to permit passing therethrough the parts carried by the plate, whereby the time measuring mechanism, receiver hook and contact springs may be supported within the cabinet by the plate.

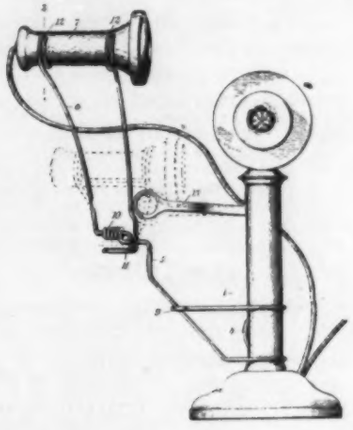
929,025. Telephone-Stand. Charles R. Schafer, Syracuse, N.Y. In combination with a telephone transmitter and a support therefor, of an upper and a lower clamp secured to the support, an adjustable and vertically disposed supporting arm suspended by said clamps, a switch arm on the support, a locking member for said switch arm, said locking member carried by the upper of said clamps and arranged at right angles



with respect to said supporting arm, a receiver supporting arm adjustably connected to said vertical arm, said receiver supporting arm having one end formed with a pair of spring jaws, clamping plates pivoted to said jaws and adapted to engage a receiver, and means carried by the receiver arm and adapted to engage said jaws for clamping the receiver to said plates.

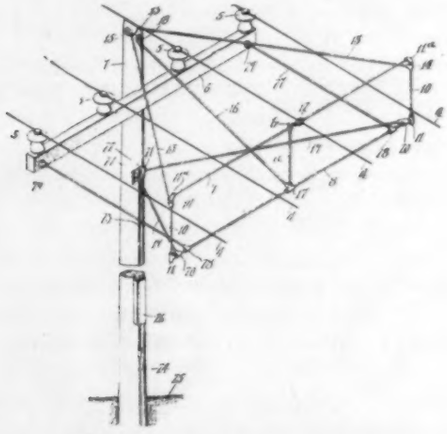
929,128. Telephone Attachment. Howard F. Hansell Jr., Philadelphia, Pa. In a telephone, the combination with an upright support, of an elongated bracket or arm supported thereon between its ends and extending rearwardly in one direction from its point of support and transversely in the other direction from its point of support, a forwardly extending transmitter supported on said rearward extension and a transversely extending receiver supported on said transverse extension.

929,404. Telephone Attachment. Benjamin E. Detrick, New Albany, Ind. In a telephone attachment, a bracket composed of a single piece of wire bent upon itself intermediate its length to provide a loop and having the said loop bent to removably engage the stem of the telephone, one of the free ends of the wire of the bracket forming said loop passing upwardly and connected with the other and having a laterally-



projecting coil at its extremity, and a frame composed of a single piece of wire bent upon itself intermediate its length and crossing said lateral offset portion of the bracket, with one of the free ends of the wire passing through the coil, and both of said free ends having seats at their extremities for holding the receiver of the telephone.

928,431. Guard for Telegraph and Telephone Wires. Charles J. Elliott, Oxnard, Cal. The combination with a wire for supplying electric current, and a supporting pole for supporting said wire, of a guard frame surrounding said wire



and means attached to the pole and extending from the pole lengthwise of the wire, and supporting said guard frame in position away from the pole, said guard frame consisting of a conductor and being grounded.

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CONTENTS

New System of the Home Telephone Company of San Francisco 129
By Samuel G. McMeen

Pole Damage by Woodpeckers 138

Patents 139
Telephone Metering System.
Telephone Stand.
Telephone Attachment.
Guard for Telephone and Telegraph Wires.

Editorial 140
Electrical Advertising.
Advertising Electricity.

Journal Portraits 141
S. G. McMeen.

Personal 141

News of the Stationary Engineers 142
California No. 3.

Books Received 142
Lessons in Telegraphy.

Pacific Coast Gas Association 142

Trade Notes 142

Industrial 143
Harmonic Telephone Installations.
Changes in Kellogg Switchboard Equipment.
New Catalogues.

News Notes 145

NOTICE OF ERRATA.

Through a typographical error in the article on the "Great Northern Three-Phase Electrification" in our issue of July 24, 1909, page 72, the interior diameter of the overflow pipe reads three inches, when it should be three feet. The address of the Pacific Coast Pipe Company is Ballard Station, Seattle, not Tacoma, as stated.

Electrical Advertising

With their proverbial alertness advertising men have been quick to grasp the opportunities offered by electrical devices in attracting and holding public attention. The electric sign whose letters of light serve a dual purpose in proclaiming the wares and in illuminating the premises, is now found in every hamlet boosting an electric plant. It is today the most prominent feature in the night life of every city and has even been adopted by certain progressive churches to announce the character of service therein. Realizing that motion is useful in getting attention many ingenius moving signs have also been devised.

The telephone, too, has proven a valuable adjunct as a business producer. Automobile concerns, especially, make their telephone number a prominent feature of all their advertising, various retailers doing likewise. Several stores publish booklets educating their patrons in the practice of ordering goods by telephone. Incidentally it behooves one so advertising to see that its incoming telephone line is as clear as any other entrance to the store.

The telegraph has come in for even greater use in modern merchandising methods which find the mails too slow. A circular telegram to the three thousand customers of a stockbroker is many times as effective as a like circular letter, because the novelty of the wire gives it a personal pulling power where the letter would probably be accorded the courtesy of the waste-paper basket. This class of business has become such an important source of income to the Western Union Telegraph Company that they now employ a man who devotes his time exclusively to it.

Advertising Electricity

While the subject of advertising is under consideration it is interesting to note the large display being carried in the newspapers by the various public utility corporations. Their campaign is one of education and directed primarily to the removal of popular prejudice. Judicious publicity is an excellent means of establishing confidence and creating friendship, but no advertising spurt at a time when such confidence has been shaken can undo the harm resulting from previous disregard of public opinion. Mr. Wm. C. McAdoo, at the opening of the tunnel connecting Jersey City with New York last month, made the statement that the policy of frankly taking the public into confidence and sincerely trying to offer good service is infinitely wiser than the opposite policy of "the public be damned." Advertising to be effective should be continuous. With the wide distribution of stock that followed the late financial depression the public service corporations find that their stockholders can also be of material assistance in molding public opinion.

JOURNAL PORTRAITS

Samuel G. McMeen, "the youngest old man in the telephone business," resident partner of the firm of McMeen & Miller of Chicago, is now completing in San Francisco the largest automatic telephone installation ever made, having been engineer for the Home Telephone Company for the past two years. He has been in the telephone business ever since graduating from Purdue University in Indiana, his native State.

For twenty years after leaving the University he was employed by the branch of the Bell Telephone Company which operated in Ohio, Indiana, Illinois and Iowa, the central Union Telephone Company, being connected with all the mechanical capacities with some service as an exchange manager.

Samuel G. McMeen

In 1893 Mr. McMeen was appointed assistant engineer of the Central Union Telephone Company and in 1896, chief engineer of that company, continuing in that capacity until 1902, when he joined the Western Electric Company as engineer in charge of telephone central office equipments, his work dealing especially with the engineering of telephoning exchange apparatus for use in America and abroad. During his connection with that service, he had occasion to make special studies, among them some interesting phases of work in the Spanish American countries.

In April, 1904, he resigned from the service of the Western Electric Company and at the same time, Mr. Kempster B. Miller resigned from the service of the Kellogg Switchboard and Supply Company, and the two entered into a partnership, forming the engineering firm of McMeen & Miller, with principal office in Chicago. This firm makes a specialty of the design and construction of telephone exchanges and long distances telephone systems; consultation, investigations and reports upon electrical projects in general, including the design of systems and apparatus; the giving of expert testimony in patent causes and legal proceedings of an electrical character, and the conduct of a general patent soliciting business, with particular reference to telephonic and other electrical inventions.

Mr. McMeen has been for twelve years a member of the American Institute of Electrical Engineers and was an associate member for a short time prior to that.

PERSONALS.

O. C. Goeriz has returned to San Francisco from an extended trip throughout the East.

J. W. White of the Fort Wayne Electric Company is in San Francisco from Los Angeles.

Harry H. Knox is now manager of the Alaska Electric Consolidated Company at Cordova, Alaska.

W. C. Sivyer, president of the Big Bend Light & Power Company of Spokane, has returned from a trip to Seattle.

O. B. Gates, manager of the Klamath Falls Light & Water Company, Klamath Falls, Oregon, was in Seattle last week.

Edwin A. Taylor is now assistant engineer in charge of field work for the Nisqually power plant, Tacoma, Wash.

Howard Aylesworth of the Aylesworth Agencies Company of San Francisco, has returned from a vacation in the South.

O. B. Coldwell, general superintendent of the Portland Railway, Light & Power Company, was a recent visitor in Seattle.

Chas. C. Gallagher has been appointed manager of the telephone office at Grangeville, Idaho, succeeding C. W. Ward, resigned.

Leigh S. Keith has joined the engineering force of McMeen & Miller, consulting telephone engineers, with headquarters in Chicago.

Robert H. McKibben, electrical engineer for the New England Fish Company, is installing a 1200 k. w. hydro-electric plant at Ketchikan, Alaska.

Arthur Smith, formerly manager of the telephone office at Benicia, Cal., is now with the engineering department of the Pacific Telephone & Telegraph Company.

Wynn Meredith, in charge of the San Francisco office of Sanderson & Porter, left this week for British Columbia to investigate some important hydro-electric matters.

George R. Murphy, engineer with the San Francisco office of the Electric Storage Battery Company, has returned to San Francisco from a trip throughout the Northwest.

F. C. Finkle, hydraulic and electrical engineer of Los Angeles, passed through San Francisco last week on his way to the Irrigation Congress now in convention at Spokane.

Chas. F. Mason, secretary to the vice-president and general manager of the Pacific Telephone & Telegraph Company, has also been appointed superintendent of leased wires, a new department.

J. W. Swaren, engineer with the Nevada Mining Machinery & Supply Company of San Francisco, has returned after completing an exhaustive test of the new water works at Gridley, Cal.

B. B. Brockett, head of the electrical engineering department of the Clarkson Memorial School of Technology, has been appointed head of the new department of electrical engineering at the South Dakota State College.

C. H. Brewster has been appointed manager of the telephone company at The Dalles, Oregon, with supervision over Wasco, Crook and Sherman counties., Ore., and Klickitat county, Wash. In this position he succeeded Mr. R. H. C. Wood, resigned.

Philip S. Biegler, formerly assistant professor of electrical engineering at the University of Iowa, and F. G. Baender, formerly assistant professor of mechanical engineering at the same institution, are now associated in the engineering firm of Baender & Biegler, at Spokane, Wash.

NEWS OF THE STATIONARY ENGINEERS.

PREAMBLE.—This Association shall at no time be used for the furtherance of strikes, or for the purpose of interfering in any way between its members and their employers in regard to wages; recognizing the identity of interests between employer and employe, and not countenancing any project or enterprise that will interfere with perfect harmony between them.

Neither shall it be used for political or religious purposes. Its meetings shall be devoted to the business of the Association, and at all times preference shall be given to the education of engineers; and to securing the enactment of engineers' license laws in order to prevent the destruction of life and property in the generation and transmission of steam as a motive power.

California.

No. 1. San Francisco. Thursday, Central Hall, 124 Fulton St. Pres., A. C. Arbuckle. Sec., Herman Noethig, 900 York St.
No. 2. Los Angeles. Friday, Eagles' Hall, 116½ E. Third St. Pres., Gabriel Allen. Fin. Sec., Harry Notthoff, 1307 Winfield St. Cor. Sec., W. T. W. Curl, 4103 Dalton Ave.
No. 3. San Francisco. Wednesday, Merchants' Exchange Bldg. Sec., David Thomas, 914 O'Farrell St.
No. 5. Santa Barbara. Geo. W. Stevens, 2417 Fletcher Ave., R. R. No. 2.
No. 6. San Jose. Wednesday. Pres., W. S. Pierson. Sec., Leal Davis, 350 N. 9th St.
No. 7. Fresno. Pres., J. F. Wagoner. Sec., F. J. Whitney, Box 8.
No. 8. Stockton. Thursday, Masonic Hall. Sec., S. Bunch, 626 E. Channel St. Pres., Jos. Gieger.

Oregon.

No. 1. Portland. Wednesday, J. D. Asher, Portland Hotel. Pres., O. H. Reed.
No. 2. Salem. A. L. Brown, Box 166.

Washington.

No. 2. Tacoma. Friday, 913½ Tacoma Ave. Pres., Geo. E. Bowman. Sec., Thos. L. Keeley, 3727 Ferdinand St., N., Whitworth Sta.
No. 3. Walla Walla. 1st and 3d Wednesday, German Hall. Pres., W. M. Quinn. Sec., O. L. Compton, Box 11.
No. 4. Spokane. Tuesday. Pres., Grant Tuttle. Sec., J. Thos. Greeley, 0601½ Cincinnati St.
No. 6. Seattle. Saturday, 1420 2d Ave. Pres., J. H. Beckman. Sec., J. C. Miller, 1600 Yesler Way.

Practical letters from engineers and news items of general interest are always welcome. Write your items regardless of style. Communications should be addressed to the Steam Engineering Editor.

CALIFORNIA NO. 3.

At the last meeting of California No. 3, N. A. S. E., Wednesday evening, August 4th, two candidates were initiated and seven applications for membership were received. The new members are Frank A. Jones and R. G. Davidson. The educational committee announced that on Wednesday evening August 11th, at 8:30 o'clock Bro. Hermann Schussler, consulting engineer of the Spring Valley Water Company, will deliver an illustrated lecture on the Spring Valley Water Company's system. Mr. Shussler has had prepared a large number of lantern slides illustrating the system's works, to be used in illustrating his lecture. This lecture which will be delivered at the association's rooms at the Merchants' Exchange Building, promises to be a very interesting one, as Bro. Schussler is considered one of the foremost authorities on that particular branch of engineering. Bro. Schussler is an honorary member of California No. 3, and has done much to further the interests of the fraternity.

The educational committee extends a cordial invitation to all friends and members of the N. A. S. E. to attend this lecture.

D. THOMAS, Secretary.

To the Editor:—Having taken charge of a 75 horsepower return tubular boiler my duties commenced on a Monday morning. After a week's run I inspected the boilers. On examination the smut box or combustion chamber in the back end was full of soot and ashes. My assistant and I worked till noon. Then I went in and found the mud drum. Around the nozzle it was as thin as paper. You may know my surprise to find I was running a man killer. The owner was sent for and the matter laid before him. That the plant would be shut down over Monday at least, I took out the mud drum and put a plate on the nozzle of the boiler with a hole tapped in for the blow off and started up Monday noon, till other arrangements could be got ready. What would you have done?

ENGINEER.

BOOKS RECEIVED.

"Lessons in Telegraphy," by C. H. Sewall, 88 pages; 4½x7¼; 11 plates; published by D. Van Nostrand, New York City; for sale by Technical Bookshop, San Francisco; price $1.00.

This book gives an elementary course of instruction in the art of sending and receiving Morse telegraph signals and should be a valuable adjunct to a student desirous of learning correct telegraph methods. It contains a series of graded lessons from the simpliest exercises to the most complex messages that an operator may be called upon to send. It is well written in simple English and the discussions and instructions are to the point.

PACIFIC COAST GAS ASSOCIATION.

The seventeenth annual convention of the Pacific Coast Gas Association will be held in San Francisco September 21, 22, 23, 1909. Some live papers have been prepared, some strange experiences will be related, and some new wrinkles sprung. It will include the usual banquet and outing.

TRADE NOTES.

W. S. Hill Electric Company, formerly of New Bedford, Mass., has been absorbed by the Taunton-New Bedford Copper Company, of Taunton, Mass.

The Cutler-Hammer Mfg. Co. of Milwaukee, makers of electric controlling devices, announce the opening of a Philadelphia office, room 1207 Commonwealth Building, and an engineer specially qualified to advise regarding the control of electric motors will be in charge of the new office.

M. L. Newman & Company have opened an office as consulting and industrial engineers at 25 Broad Street, New York City. M. L. Newman, the senior partner of the firm, is well known through his long association with the United States Government at the Brooklyn Navy Yard. Alphonse Kaufman severs his connection as manager of the Alaska Chemical Company, New York, to become associated with the new company.

The Kellogg Switchboard and Supply Company of Chicago announce that J. C. Murray has been appointed district sales engineer for the States of Illinois, Indiana, Ohio, West Virginia, Kentucky and the southern territory. F. C. King of the Logansport Home Telephone Company will continue Mr. Murray's excellent work in Indiana. Both these gentlemen are well known telephone men of long experience, and the widening of their field of work will be of interest to the trade generally.

The Spencer Wire Company, of Worcester, Mass., has just contracted to duplicate its present installation of a Westinghouse, 16-inch by 18-inch, vertical gas engine, rated at 200 horsepower, and a 250 horsepower Westinghouse suction producer plant, to meet the power needs of its factory. The engine will be direct connected to a 135 kilowatt, three-phase, 440 volt, 60 cycle alternator, similar to that now running. The initial equipment was but recently installed and is representative of the most improved producer-plant practice for a moderate capacity.

The demand, which recently led the General Electric Company to extend its production of Tungsten lamps into voltages from 200-250, also included the other metallic filament lamps. In response to this demand, the company has formally listed and is now producing tantalum lamps adapted for the higher voltages, thus obviating the inconveniences of having to operate two tantalum lamps in series. These 200-250 volt tantalums—50 and 80 watts respectively—have given most excellent results on service tests, their life averaging fully up to that of the regular 100-130 volt tantalums of the same efficiency, two watts per candle. They are respectively 2⅝ inches and 3¾ inches in diameter.

INDUSTRIAL

HARMONIC TELEPHONE INSTALLATIONS.

Like many another invention of the present day, harmonic selective signalling for telephone systems was not successfully developed by the first man who conceived the idea, and furthermore, like a vast number of improvements in the art of telephony it devolved upon independent engineers to successfully solve the electrical and mechanical problems. A number of years ago an attempt was made by the Sunset Telephone Company to equip its Sacramento exchange with a selective signalling system which depended upon harmonic relations between the signalling current and the signalling apparatus, but many a former telephone user in Sacramento can vividly recollect the exasperating results obtained, which eventually ended in the consignment of the experimental equipment to the scrap pile.

When the Kellogg Switchboard & Supply Company secured the contract for the big Independent system in Buffalo, N. Y., one of the terms of the contract was that a satisfactory signalling system should be provided whereby as many as four subscribers could be operated on one metallic circuit and any one signalled without disturbing the other three on the same circuit. This put the proposition up to the engineering department of the Kellogg Company, and as a result the present harmonic signalling system was produced. However, the system as at first designed, was only applicable to large exchanges, owing to the necessity of using a multi-cycle motor-generator set for generating the four frequencies of alternating current employed. Such a set was expensive, and the cost prohibited the small exchange operator from availing himself of this improvement.

Kellogg Full Common Battery Multiple Harmonic Switchboard at Monrovia, Cal.

The development of the harmonic pole changer was the means whereby the harmonic system was put within the reach of all operating companies, whether furnishing service to 100 subscribers or 10,000. This device is so perfected that less trouble is experienced in operating it than formerly occurred with the ordinary ringing outfit.

Briefly stated, the pole changer consists of four vibrating units which cause the flow of alternately reversed 24-volt direct currents through the primary windings of their respective transformers, the secondaries of which transmit to the switchboard ringing circuits the alternating currents of the proper voltages and frequencies. The first unit generates a 16 2-3 cycle current, the second 33 1-3, the third 50 and the fourth 66 2-3. The voltages of all currents are the same, 125 volts.

Either the 16 or 33 cycle current can be used for ringing ordinary polarized ringers, so that an exchange equipped with an harmonic pole changer does not require any other source of ringing current for individual or toll or rural lines.

The harmonic system is suitable for rural service in connection with magneto equipment, as well as for city service with common battery equipment. When used in connection with a magneto central office equipment, a number of dry batteries is used in place of the storage battery with common battery systems. The accompanying illustration shows the relative amount of equipment for harmonic service alongside the standard power equipment consisting of motor-generator set, power board, and storage batteries.

In 1906 when the Monrovia Telephone & Telegraph Company rebuilt its plant the management decided to equip it with a Kellogg full common battery multiple harmonic switchboard, thus making it the first harmonic installation west of the Rocky Mountains. The wisdom of this decision is readily illustrated above. It has never been necessary to increase the original central office installation, although the number of subscribers has almost doubled. There are 340 lines equipped at present, with about 300 in service, and on these 300 lines are operating over 700 telephones. So rapid is the operation that three operators are able to handle the traffic when it is heaviest, and included in this is the work of completing about 200 "in" and "out" Los Angeles toll calls, daily. Perhaps the most convincing proof of the perfect satisfaction that this original harmonic equipment is giving is the fact that for sometime past the Monrovia Telephone & Telegraph Company has had no competition from any other telephone company within its territory.

Standard Telephone Power Equipment

Since the Monrovia installation demonstrated the success of the harmonic system, many other operating companies have installed similar equipment, until there are now almost 30 Kellogg harmonic plants on the Pacific Coast. The Pomona Valley Telephone & Telegraph Union, the Independent operating company in and around Pomona, Cal., is one of the best examples of Harmonic development. It is operating 2400 harmonic telephones on a board equipped at present with 640 lines.

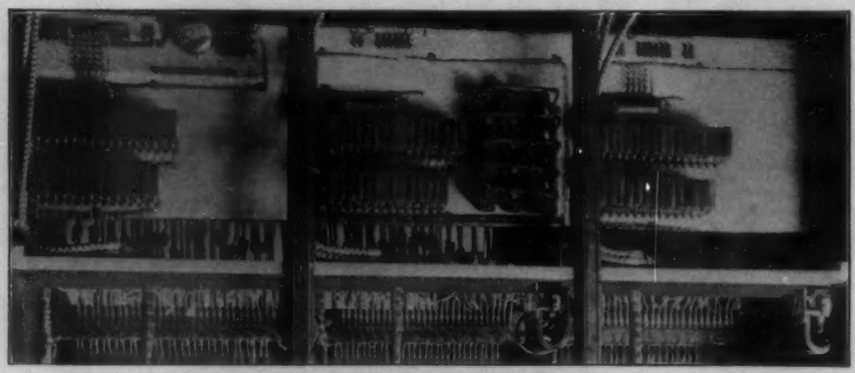
The demand for harmonic service has now reached inland to Arizona, and the Kellogg Company is now installing complete harmonic central office equipments in Prescott and Bisbee, Arizona.

CHANGE IN KELLOGG SWITCHBOARD EQUIPMENT.

After careful and exhaustive tests to prove superiority, a somewhat different arrangement of apparatus and framework in the lower rear part of Kellogg magneto switchboards has been made. The advantages of the changes are given herewith with illustrations showing the convenient arrangement of condensers and repeating coils on Kellogg magneto boards. All new magneto switchboards are finished in this way.

Boards having condensers or repeating coils in the cord circuits are arranged with these parts secured firmly to the connecting rack, raised from the bottom of the frame and facing the rear. The advantage of this method is obvious. The coils and condensers are more easily reached for cleaning, inspecting or repairs, and they cannot catch the dust and dirt as they do when located in the bottom of the switchboard. This method also allows the use of longer cords, as all wiring to the connecting rods and apparatus thereon is on the rear side, and there is complete protection from accidental injury by the cord weights. The cable is also secured to best advantage for inspection.

Another special feature of the recent type of Kellogg boards is that the coil on which the rear door sets is removable. When this is moved, the floor of the cabinet can



Rear View of Kellogg Magneto Switchboard.

be easily cleaned of dirt, as the bottom part of the removable rail is flush with the bottom of the cabinet.

The cabinets are arranged with holes for the line cables in such a way that the cables may go down through the bottom of the cabinet and thence under the floor of the switchboard room without being visible from the rear, or they may be brought out at the rear of the cabinet below the removable door rail. This is done without any cutting of the board frame.

In each position there is an adjustable metal escutcheon in the rear, which can be revolved and the proper opening made to fit the line cable brought out in the rear. If the cable goes down through the floor, this escutcheon is twined in such a manner that the cable hole is entirely covered. This is a valuable feature.

With the "Kellogg Quality" idea ever in mind to produce telephone apparatus that telephone men generally realize is the best because of its service record everywhere, the advance in popularity of Kellogg magneto switchboards has been phenomenal.

NEW CATALOGUES.

"J. H. Non-Burn Brake Band Lining," is a new asbestos product by H. W. Johns-Manville Company described in a bulletin devoted to automobile specialties.

"Hot Points" for July, 1909, from the Pacific Electric Heating Company, Ontario, California, contains some excellent testimonials from central stations and dealers as to the advantages of the Hot Point Electrical Iron.

"Trumbull Cheer" for August, 1909, from the Trumbull Electric Manufacturing Company, Plainville, Connecticut, contains its usual humorous sketches, interspersed with business hints and descriptions of Trumbull apparatus.

"What They Think of the Telephone in Train Dispatching" is a collection of opinions of thirty superintendents of telegraph of the chief railroads in this country issued by the Kellogg-Switchboard & Supply Company of Chicago.

Holophane Illumination, July, 1909, from the Holophane Company, contains a number of attractive illustrations of the use of Holophane globes for efficient lighting, and a number of notes as to how these globes may be used to increase the central station income.

The Harvard Electric Company of Chicago and New York have just issued Bulletin No. 18 relating to brackets, sectional switch boxes, conduit boxes, telephone fuses, wire joints, etc. This bulletin includes details of the various Harvard specialties, with dimensions.

The Dean Electric Company of Elyria, Ohio, has issued a little pamphlet printed in colors describing the Patrol Flash-Light designed for use with their police and fire telephone system. It covers a complete description of this system with illustrations showing the headquarters, equipment and street boxes.

Bulletin No. 23 from the Holophane Company, San Francisco office 151 New Montgomery street, contains illustrations and descriptions of Holophane D'Olier Steel Reflectors for Industrial Lighting. The bulletin also contains a number of excellent half tones of various uses to which these reflectors are applied.

The Stromberg Electric Manufacturing Co. of Chicago are distributing a descriptive booklet on the Chronograph manufactured by them which is an electric time reporter controlled by a master clock. It very completely illustrates and describes this system and suggests numerous conditions under which it can be adapted to existing business organizations.

Pass & Seymour, Solvay, N. Y., have issued a bulletin (No. 552) devoted to receptacles for decorative work. Prominently mentioned is the type of receptacle which is shipped already connected upon the wire, and which is supplied in any length or streamers a customer may desire, thereby saving time, labor and material.

"How to economize in the Home" is the subject of an interesting leaflet issued by H. W. Johns-Manville Company, showing the application of their various compounds for domestice use. This includes their Leak-No-Metallic Compound, the H.O Pipe Joint Cement, the Keystone Range Boiler Cover, the J-M Asbestos Stove Lining, the Keystone Hair Insulator, the Linolite Table, the Metallo Metal Polish, the J-M Asbestos Roofing, the Zero Pipe Covering, etc.

The American Electric Fuse Company of Muskegon, Mich., are distributing a perpetual catalogue of their telephone specialties which includes fuses, fuse blocks, lightning arresters, and cut-outs, cable terminals, and spark coils. This catalogue is a very creditable piece of work and compared with catalogues of the past is fully in keeping with the progress of a business which they state was started on a kitchen table with a cash capital of $10.00 and has grown to the point where it now employs 400 workmen, occupies 75,000 square feet of floor space and represents an investment of over $500,000.

NEWS NOTES

FINANCIAL.

CHEHALIS, WASH.—A special election will be held August 17 to legalize the $15,000 bond issue of the city.

HOOD RIVER, ORE.—The proposition to bond the city for $90,000 for a water system was defeated today by one vote.

ST. HELENS, ORE.—By a large majority the people of St. Helens have voted bonds for $40,000 for the purpose of providing an adequate water system.

JACKSONVILLE, ORE.—The Council has appointed a committee of three to obtain an estimate of the probable cost of a water works system and report at the next meeting.

WILBUR, WASH.—Sealed bids are being received at the office of the City Clerk for the purchase of water bonds in the sum of $4100 for the purpose of purchasing iron mains and piping.

SANTA BARBARA, CAL.—The City Council has passed a resolution declaring the regularity of the sale of $40,000 in water works extension tunnel bonds of the city, to James H. Adams & Co.

NEWPORT, ORE.—An amendment to the city charter authorizing the common council to purchase or construct water works and to borrow money to the amount of $30,000 has been adopted.

SAN FRANCISCO, CAL.—The Supervisors have adopted the recommendation of the public utilities committee, favoring the resubmission to the voters of the proposition to issue bonds for the conversion of the Geary street road into a city system and the fixing the first week in December as the time for holding the special election.

NORTH YAKIMA, WASH.—The City Council has directed the City Engineer to prepare plans for an entirely new water system for North Yakima to cost $30,000. Work is to commence immediately. A reservoir will be constructed and a 24-inch main put in to the present intake of the N. W. Light & Water Company. Water bonds may be issued to cover the cost.

OAKLAND, CAL.—The Contra Costa Water Company has won a temporary victory over the city of Oakland in its injunction suit against the city. The Supreme Court has set aside its judgment of a month ago and ordered a rehearing of the case. There will be no further arguments made to the Court, but all the papers have been submitted. The Court will sit on the case en banc, and it is expected that a decision will be handed down within the next ninety days.

INCORPORATIONS.

BAKERSFIELD, CAL.—Aztec Oil Company, capital stock $250,000, by G. Sheridan, W. A. Sloan, R. T. Fisher, H. T. Earl and W. E. Buck, all of San Francisco.

SALINAS, CAL.—Lone Pine Oil Company, capital stock $200,000, subscribed $2400, by J. H. Menke, F. W. Schroeder, G. A. Daugherty, Harry Winham, oJhn Berges and others.

FRESNO, CAL.—Fresno Power Company, of San Francisco, capital stock $1,00,000; subscribed $500, by G. A. Knight, J. M. Ough, H. M. Woolley, C. J. Haggerty and W. M. Madden.

WALLA WALLA, WASH.—Articles of incorporation of the John Day Power Company have been filed here with H. G. Blalock, Y. C. Blalock, W. J. Mariner and W. D. Lyman as incorporators. The capital stock is $500,000. The object of the company is to generate electric power from the John Day and Deschutes rivers and their tributaries and to supply water for irrigation and domestice purposes in the States of Washington and Oregon.

TELEPHONE AND TELEGRAPH.

SPOKANE, WASH.—The Interstate Telephone Company, Empire State block, is planning to rebuild its lines near Santa, Idaho.

EUGENE, ORE.—The Pacific Telephone & Telegraph Company will soon begin construction of a through line from Eugene to Natron and Klamath Falls.

ROSEBURG, ORE.—The Pacific Telephone & Telegraph Company has started on the construction of a double metalic telephone circuit between this city and Coos Bay.

CENTRALIA, WASH.—J. Y. Coffman was granted a franchise to erect and operate a telephone line along and over the country road leading from the Northern limits of the city of Chehalis to the limits of the fair grounds of the Southwestern Washington Fair Association.

GREAT FALLS, MONT.—The Great Falls Automatic Telephone Company has been incorporated by George H. Stanton of this place and others, with a capital stock of $500,000. The company will erect a two-story and basement brick building, to cost $25,000 and other work in and about the city performed.

SAN FRANCISCO, CAL.—The Home Telephone Company has acquired through A. J. Rich & Company sites in the Richmond district and Sunset district for new branch stations for its system. The land purchased is centrally situated in each instance. According to the agents, the company will, as soon as title is passed to the lands, construct stations of steel and stone and use them for the business of the districts in the west end of the city. Each district is to have a separate system connecting with the main automatic system downtown.

TRANSMISSION.

REDDING, CAL.—The Northern California Power Company has been given a contract to construct and equip a power line from the Brunswick to the Lappin mine.

BISHOP, CAL.—The supervisors have received an application from Ben H. Yandell for a franchise to construct and maintain a power line in Inyo county for supplying electric light and power.

TULARE, CAL.—The Mt. Whitney Power Company has purchased a lot directly east of the end of Kern street, where a sub-station will be erected for supplying lights and power to this city.

STOCKTON, CAL.—An electric power line is to be constructed across the islands to supply the reclamation plans and pumps. About 10,000 volts will be distributed to the Weber, J. C. and C. B. Smith and Eaton Buckley and Wallace tracts.

SEATTLE, WASH.—The council has passed the bill requiring public service corporations to place all electric wires underground in the district from King to Cedar street, and from Post street to Fourth ave. Three years' time is given to make the change.

MONTEREY, MEX.—Extensive hydraulic surveys made at the instance of the Sombreete Mining Company, of Zacatecas show that from 8,000 to 10,000 horsepower can be developed along the Durango river in that district. The company plans to put in a hydraulic plant and transfer power to mines and reduction works in the Nieves and Chalchihuites districts.

WASHINGTON, D. C.—Carrying out the policy of Secretary Ballinger of the Interior Department in preventing the monopolization of great water power sites by large corporations, Acting Secretary Pierce has withdrawn for temporary power sites 25,086 acres of land along the Green river and its tributaries, in Wyoming. All the water power sites withdrawn will be reported by the Secretary to Congress in order that legislation may be enacted by Congress to preserve them to the government.

REDDING, CAL.—In obedience to the temporary injunction issued last week out of the Superior Court, the Sacramento Valley Power Company has removed its dam across Old Cow Creek, thus permitting all the stream to flow through its natural channel. The company had been diverting 400 miners' inches through its ditch to South Cow Creek and thence to its power plant. Losing the 400 inches does not at present discommode the power company, as there is still plenty of water in South Cow Creek to operate its power plant to full capacity.

EUGENE, ORE.—C. P. Houston of Junction is in this city in the interests of the power plant scheme at Triangle Lake. He states that Leland Spencer of San Francisco is expected here in a few days to superintend the construction of the dam and canal for the plant. The machinery is expected to arrive in a few days. The Pacific Light & Power Company is said to be behind the scheme. The system will cost about $250,000, and it is proposed to furnish light and power to Eugene, Junction, Springfield, Corvallis and all other cities in the upper Willamette valley.

BODIE, CAL.—The Walker River Electric Power Company, headed by George P. Costigan and Dr. A. L. Pollard of Denver, Colo., has secured from J. P. Conway of Sweetwater, Nev., deeds to his water rights on the East Walker river, and certain lands adjacent. With the expenditure of upwards of $750,000, the company will erect a power plant to supply the mine operators at Sweetwater, east to Lucky Boy and Hawthorne, west to Aurora and Bodie, and north to Masonic. The East Walker river, from which the power will be generated, has a flow of 6000 cubic inches per second during the driest seasons.

OAKLAND, CAL.—The City Council has set September 15th as the date for the sale of the franchise applied for by the Great Western Power Company. The franchise provides that the company shall not carry more than 15,000 volts through the city without the sanction of the Board of Public Works and the city electrician. This was so worded as not to apply to the company's sub-station at the head of Fourth avenue, which is reached by the company's wires carrying 100,000 volts. There were other changes of minor importance. The ordinance is declared to be the most drastic ever drawn to be sold to a public service corporation by the city.

ILLUMINATION.

FORT WINGATE, N. M.—Sealed bids will be received until August 18th for electric wiring of the Post Exchange and Gymnasium here.

SPOKANE, WASH.—Henry L. L. Dohorty & Company of New York, purchasers of the Spokane Union Gas Company are planning for immediate improvements to the system. About 15 miles of new mains will be laid and motors installed.

HELENA, MONT.—Within six weeks seven or eight hundred men will be at work on the Wolfe Creek dam according to G. O. Muhlfield, general construction manager of the Stone-Webster Engineering Corporation.

PRINEVILLE ORE.—The Crook County Light & Power Company of Redmond, Ore., has begun a 25-foot dam a mile above Cline Falls, where it is expected to generate 15,000 horsepower for the lighting of several towns in the Des Chutes valley.

EUGENE, ORE.—The Pacific Light & Power Company, headed by W. S. Spencer, of Cincinnati, O., is taking steps to condemn right-of-way for a proposed canal at Triangle Lake, 35 miles west of Eugene. The company proposes to furnish light and power for Eugene, Junction City, Corvalis and other upper valley cities.

MARE ISLAND, CAL.—Sealed proposals will be received at the Bureau of Yards and Docks, Navy Department, August 28, 1909, for structural steel frame for Central Power Station Building No. 121, U. S. Navy Yard, Mare Island, Cal. Plans and specifications can be obtained on application to the bureau or to the commandant of the navy yard named. R. C. Hollyday, chief of bureau.

TRANSPORTATION.

LOS ANGELES, CAL.—The Pacific Electric Company was the only bidder for the franchise on Seventh street in the Long Beach road district, paying $100 for the right.

SAN DIEGO, CAL.—Geo. W. Purcell has asked for a franchise for an electric railroad over a series of downtown business streets and through the residence section northwestward to El Cajon.

QUINCY, CAL.—George Mower has the contract for ties from the Quincy and Eastern electric line to be built from this place to Hartwell Station on the Western Pacific over a route about six miles long.

VALLEJO, CAL.—The directors of the Vallejo and Napa Valley Electric Railroad are to ask the trustees for a franchise to build a loop road in conjunction with the present line in the eastern part of the city.

SAN FRANCISCO, CAL.—The relaying of Fillmore street with 141 pound grooved rails is to be begun at once by the United Railroads, according to a letter received by the Fillmore Improvement Association from Thornwell Mullaly, assistant to President Calhoun.

MARYSVILLE, CAL.—A company of Sacramento, Sutter and Yuba county people will be formed to build an electric road from Marysville to the Sutter Buttes, thirteen miles west of this city, and to include an inclined tramway to the top of the highest butte, which stands at an altitude of 1000 feet.

RIVERSIDE, CAL.—Orders have been given to begin the work of laying rails and completing the line of the San Bernardino Valley Interurban Railway Company between Riverside and Colton. This line is owned by the Huntington interests, and will eventually become part of the Riverside line to Los Angeles.

EUGENE, ORE.—The Willamette Valley company, of which A. Welch is the head, is making arrangements for the construction of a hydro-electric plant at Martin's Rapids. J. R. Thompson, consulting engineer, of Portland, is doing the engineering work. The same company is planning to build a number of extensions in the lower valley during this year, the first to be from Eugene to Junction City this fall, and ultimately to Portland.